TAGHeuer

PROFESSIONAL TIMING

Minitimer HL 440

User Manual

Version 08/2012

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1. Introduction

- The Minitimer **HL 440** is a professional timing system with 4 inputs using the same « high Technology » as our Chronoprinter 540. It is an essential general-purpose timer for many applications.

- The **HL 440** has a high precision “time base”, ideal for communication bi-directionally with a computer. It supersedes the popular PTB 605 and 606. Together with TAG Heuer software it is possible to print the calculated times and the name of the competitors on the Martel (HL 200) printer (connected to Minitimer).

- It memorizes 30'000 times in 99 timing sessions with a user-selected precision between 1 second and 1/100' 000th of second.

- The Minitimer can be connected to our Martel **HL 200** printer enabling the printing of times on line (ON LINE) or in download mode (OFF LINE).

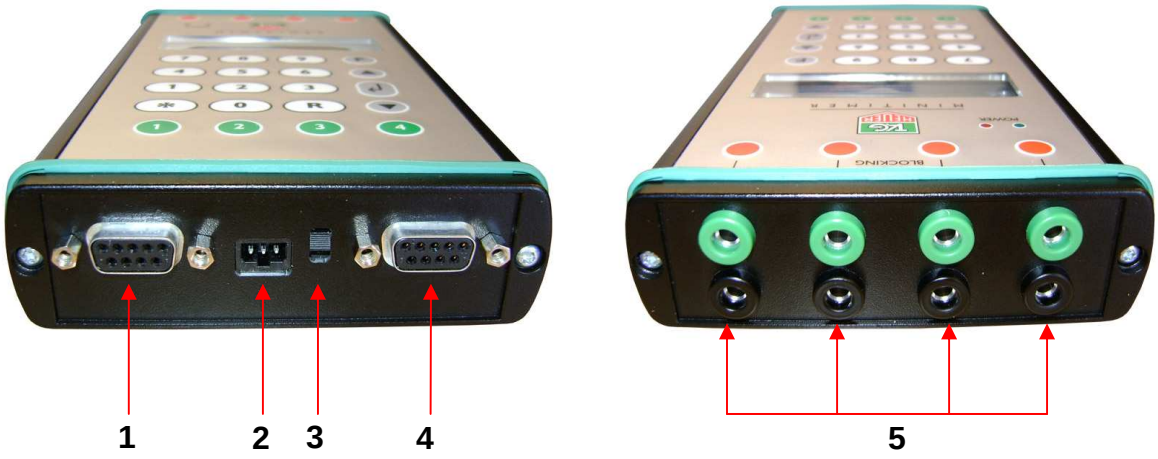
- The **HL 440** can be used at the start of a race (Alpine skiing for example) as a numerical-keyboard to identify the competitor’s number. As soon as the competitor leaves the start both the time and the competitor number will be transmitted to the timekeeper by wire connection, or by our radio transmission system (**HL 670** or **HL 680**).

- It is also an excellent backup system (manual or automatic). The competitor number can be introduced before or after the timing impulse (**RECALL function**)

- Two Minitimers can be connected together (or to a Chronoprinter 540) to provide up to 8 input channels.

- The Minitimer has a special timing mode called “Training,” which is designed for the automatic training sessions (Start, Inter 1, Inter 2 and Finish)

2. Technical description



1. **RS 232 PC**: Sub-D9f connector for bidirectional serial communication with PC. It is possible to download Online or Offline one or several sessions. This serial connector is also used for a Master/Slave syncing **Output.**

2. **Power**: External power supply to recharge the internal batteries.
   Power supply HL540-1 (110-220 Vac / 12 Vdc).
   Connection to an external 12Vdc battery is possible by using the HL520-17 cable.

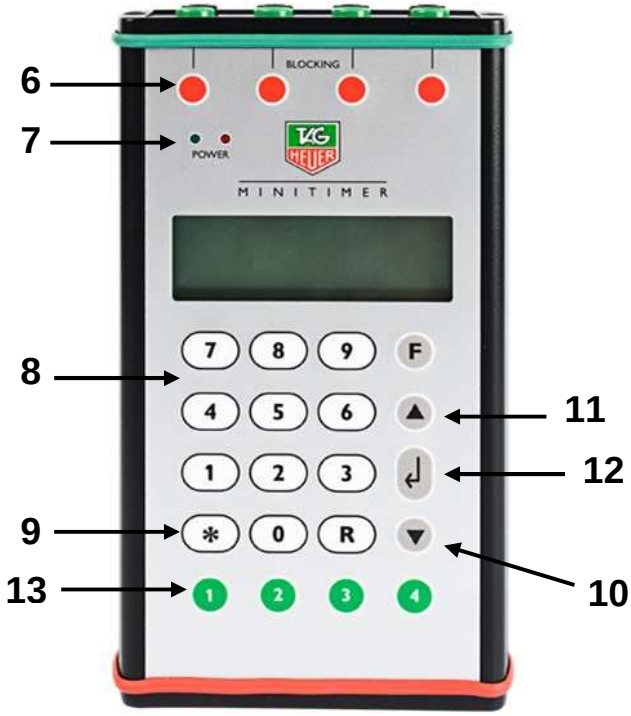
3. ON/OFF power switch.

4. **RS 232 (printer, display)**: Sub-D9f connector for the Martel HL200 Printer. It is possible to print Online or Offline one or several runs. This serial connector is also used for a Master/Slave syncing **Input, or to send data to a TAG Heuer display board (Training mode)**

5. Four banana jack inputs for external timing impulses and/or synchronization. Working contact (normally-open collector).
   Ex.: Manual push button (HL 18), photocells (HL 2-31/35) start gate (HL 7-1/3).

Respect the correct polarity!

The Minitimer HL 440 provides a visual (on the LCD) and audio alarm, should an external input remain in short-circuit. This feature allows you to observe the status of TAG Heuer's new "direct-response" photocells (HL 2-31, HL 2-35 and HL 2-32 – serial number 7000 or higher), and allows the timekeepers to instantly determine if a photocell is out of alignment.



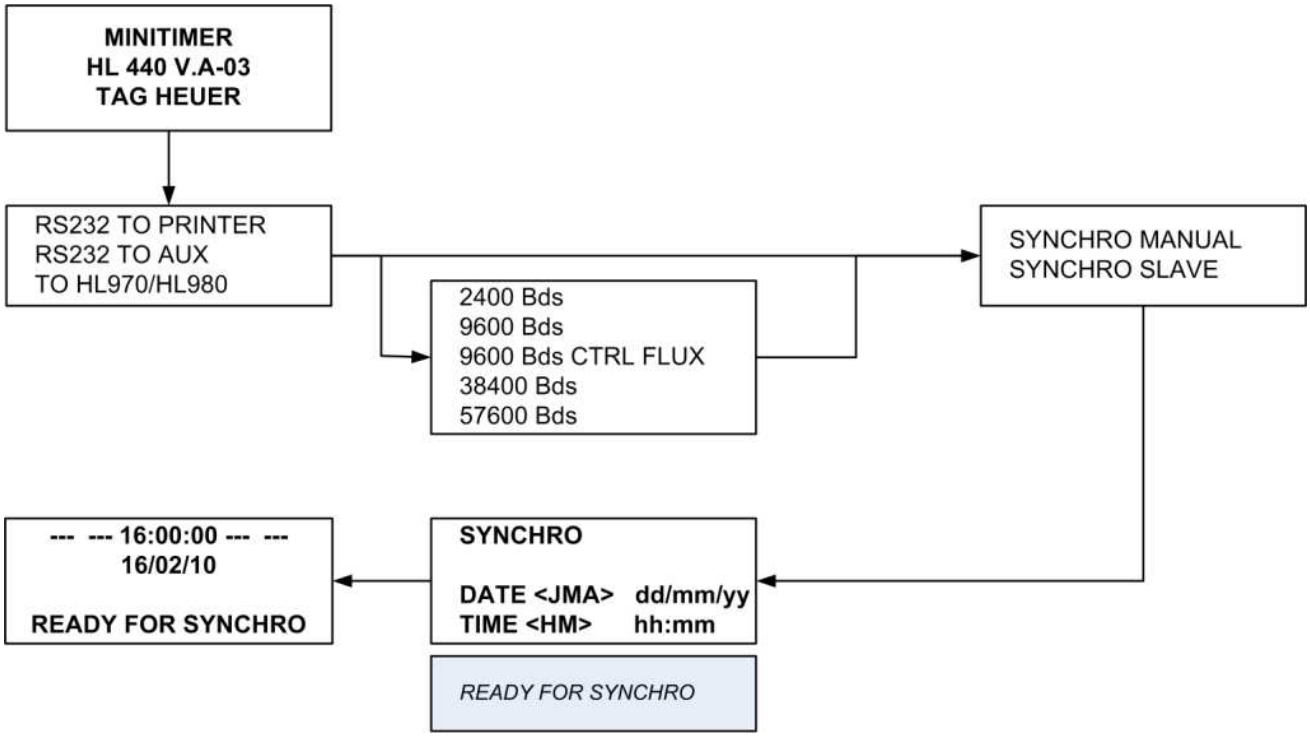
6. **Blocking**: Manual keys to unblock and block the External inputs 1 – 4. An input is blocked when the corresponding black bar is shown on the LCD display.
7. **LED Power**: Two led lamps (green and red) show the battery loading progress and the external power supply function.
8. **Keyboard**: to enter the time and date for synchronisation, and for introducing competitor numbers, distances and arrival windows (Training mode)..
9. **« * » Star Key** "**ERROR"** – to cancel an incorrect number you entered or to confirm a menu option. Also used to cancel printing.
10. **« R » Key** "**RECALL"**: to access the unassigned memorized times of a channel for identification.
11. **UP/ DOWN keys**: to navigate the menu and to scroll through the unassigned memorized times.
12. **ENTER**: to confirm a menu selection, time, date or competitor number.
13. **Green Keys**: Manual Impulse and time-of-day synchronization.

Warning

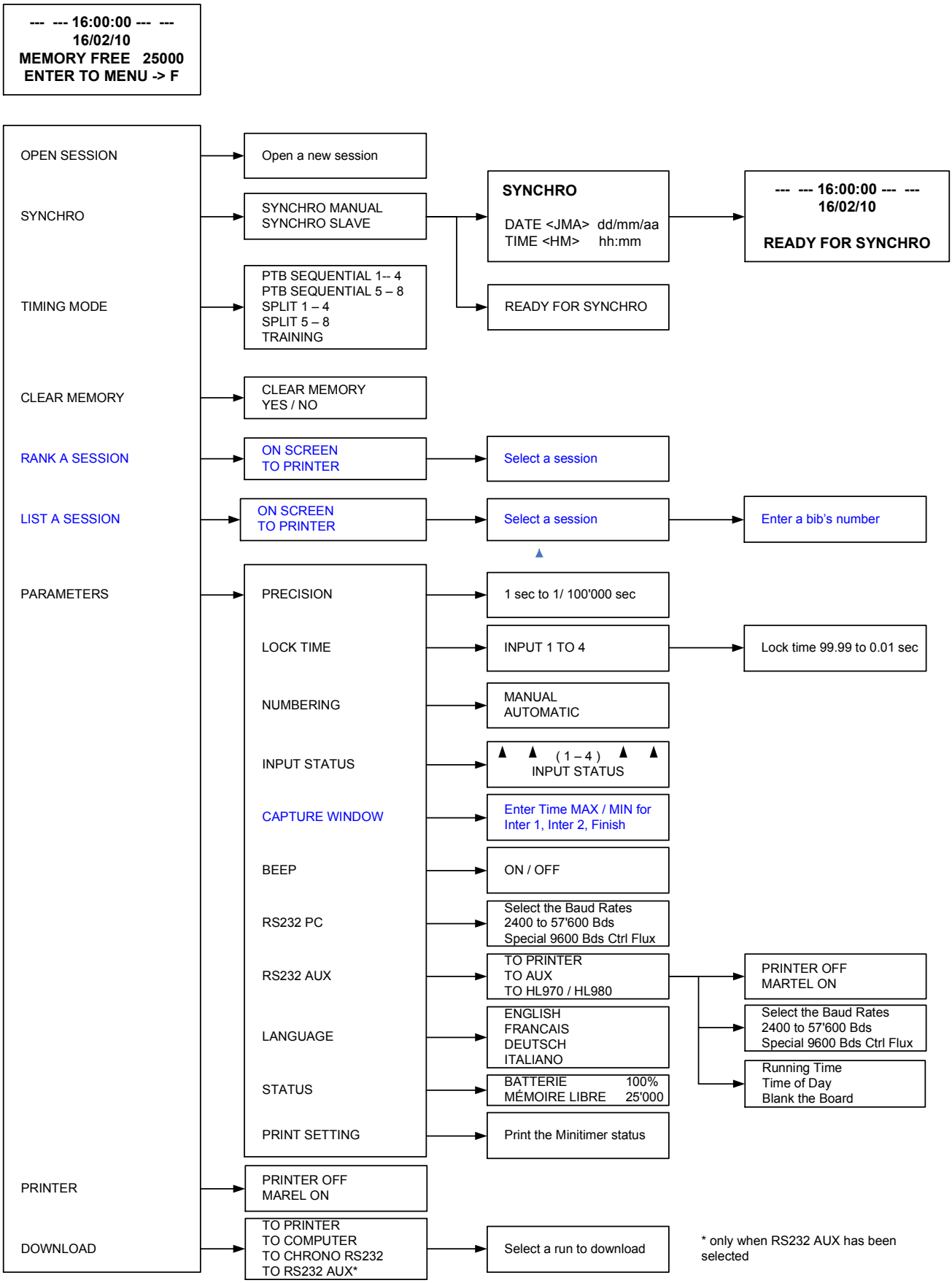
The manual timing keys (1 to 4) do not guarantee timing precision. Only two simultaneous impulses can be processed at a time from the manual keys.

3. Function Menus <F>

3.1. Power on Menu

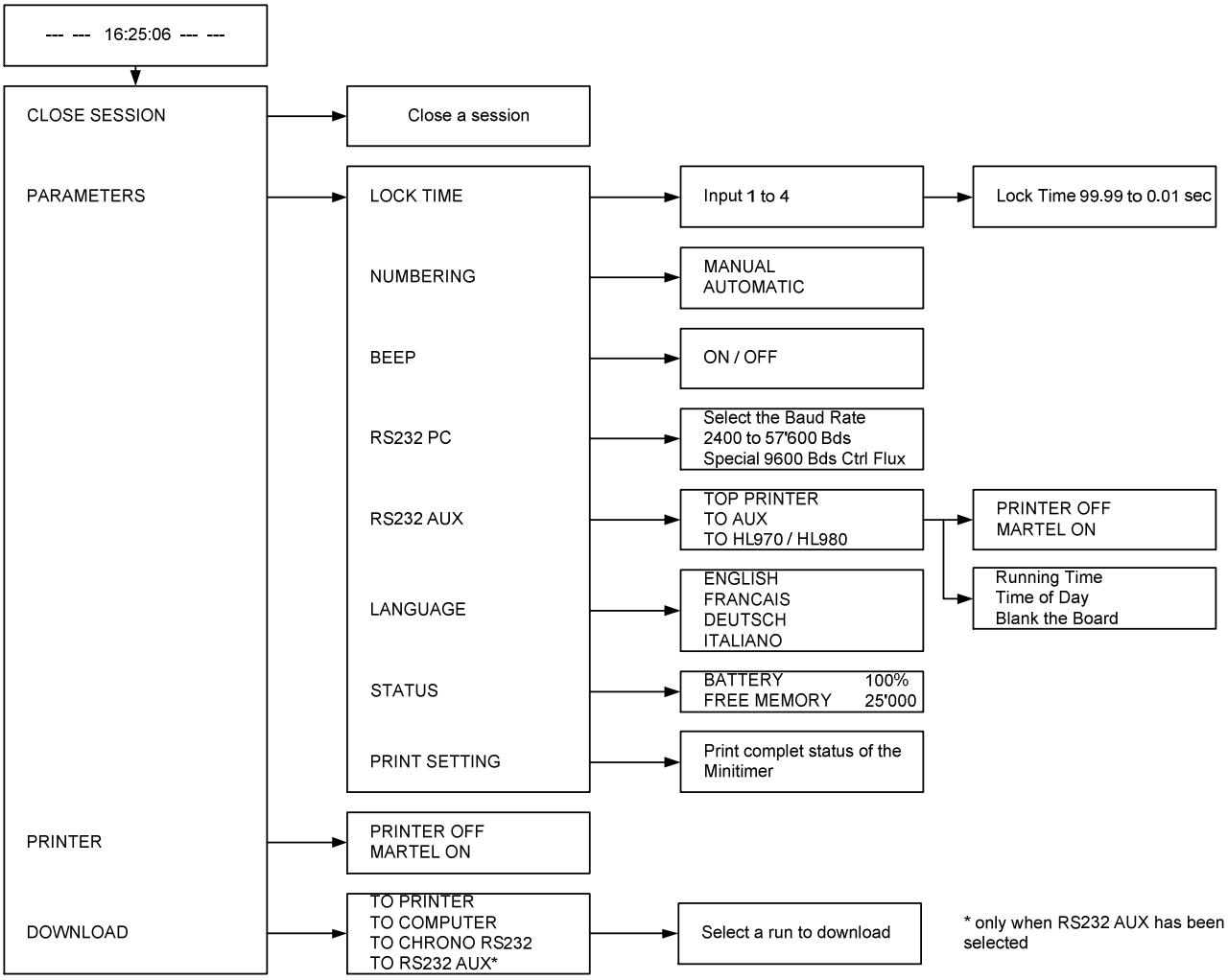


3.2. Main Menu

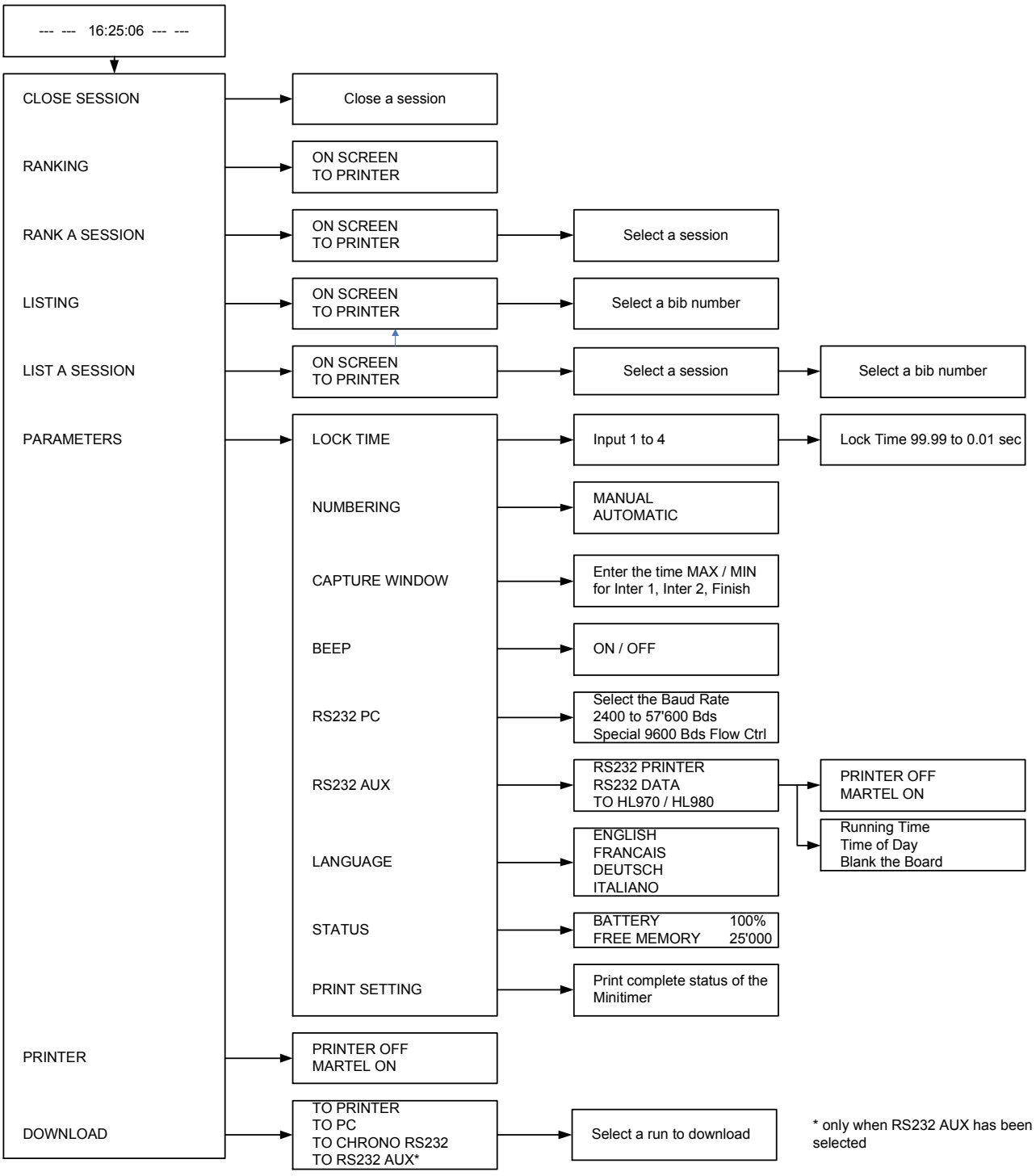

--- --- 16:00:00 --- ---
16/02/10
MEMORY FREE 25000
ENTER TO MENU -> F
OPEN SESSION
Open a new session
SYNCHRO
SYNCHRO MANUAL
SYNCHRO SLAVE
SYNCHRO
DATE <JMA> dd/mm/aa
TIME <HM> hh:mm
--- --- 16:00:00 --- ---
16/02/10
READY FOR SYNCHRO
READY FOR SYNCHRO
TIMING MODE
PTB SEQUENTIAL 1-- 4
PTB SEQUENTIAL 5 – 8
SPLIT 1 – 4
SPLIT 5 – 8
TRAINING
CLEAR MEMORY
CLEAR MEMORY
YES / NO
RANK A SESSION
ON SCREEN
TO PRINTER
Select a session
LIST A SESSION
ON SCREEN
TO PRINTER
Select a session
Enter a bib's number
PARAMETERS
PRECISION
1 sec to 1/ 100'000 sec
LOCK TIME
INPUT 1 TO 4
Lock time 99.99 to 0.01 sec
NUMBERING
MANUAL
AUTOMATIC
INPUT STATUS
(1 – 4)
INPUT STATUS
CAPTURE WINDOW
Enter Time MAX / MIN for
Inter 1, Inter 2, Finish
BEEP
ON / OFF
RS232 PC
Select the Baud Rates
2400 to 57'600 Bds
Special 9600 Bds Ctrl Flux
RS232 AUX
TO PRINTER
TO AUX
TO HL970 / HL980
PRINTER OFF
MARTEL ON
Select the Baud Rates
2400 to 57'600 Bds
Special 9600 Bds Ctrl Flux
Running Time
Time of Day
Blank the Board
LANGUAGE
ENGLISH
FRANCAIS
DEUTSCH
ITALIANO
STATUS
BATTERIE 100%
MÉMOIRE LIBRE 25'000
PRINT SETTING
Print the Minitimer status
PRINTER
PRINTER OFF
MAREL ON
DOWNLOAD
TO PRINTER
TO COMPUTER
TO CHRONO RS232
TO RS232 AUX*
Select a run to download
* only when RS232 AUX has been selected

3.3. Menu during a Run

3.3.1. In PTB / Split mode



3.3.2. In Training mode



4. How to use the Minitimer

4.1. Recharge the internal battery before starting a new timing session.

➢ Minitimer **OFF** and connected to the power supply HL 540-1 AC/DC: the red L**ED** is ON while charging. The red LED turns OFF when the battery is completely charged.

➢ Minitimer **ON** and connected to the power supply HL 540-1
The red LED is ON while charging.
The red LED is OFF when the battery is completely charged.
The green LED is ON (power supply connected)

Without the external power supply, the green LED turns on briefly at power up and then turns off.
When the capacity of the battery reaches 30%, the green LED flashes, indicating that your Minitimer is operational for approximately 8 hours.

INFORMATION
The capacity of the battery can be checked via the function menu <F> PARAMETER – STATUS.

IMPORTANT
Never charge the device under 0℃ (32℉) and over 3 0℃ (86℉)

4.2. Switch ON the Minitimer.

➢ Switch ON the Minitimer
➢ The LCD illuminates for 5 seconds
- Minitimer HL 440 and the Firmware version (V.B – 06)

➢ Select how the Serial output should be used
- **RS232 TO PRINTER**
  The data will be configured for a serial printer (**HL 200** - Martel).
- **RS232 TO AUXILIARY HL440 OR PC.**
  In this mode, the synchronized data and time-of-day are sent with a “top second” signal. You’ll be able to adjust the baud rate. We recommend using 9600 Bds.

- Select your synchronizing method :
  ➢ Synchro Manual
    - Enter the current date and confirm with ◄┘
    - Enter the time-of-day(format HH:MM) and confirm with ◄┘
    - Synchronize the Minitimer with any Green Manual Impulse Key (1 – 4). If the timer is to be synchronized with another device with an external input (1 – 4), do not forget to unblock the input (Red key 1 – 4).

    The LCD display shows
    - Four black bars (▬) which indicate that all the four inputs are blocked,
    - The time of the day and the date

  ➢ Synchro Slave
  This will put the Minitimer in Slave mode. The Device will wait for the synchronized time-of-day information through the serial Input « Printer » from a «master» Minitimer.
  For more information, please refer to «configuration» at the end of this user manual.

4.3. Connection to the Martel HL 200 Printer

- Read the printer user’s manual carefully.
- Connect the printer to the Sub-D9f **on the right.**
- First turn on the printer, and then turn on the Minitimer.

5. Menu (F)

- **OPEN RUN**: start a new timing run after closing the previous run. The run number is displayed when input 1 is unblocked.

- **CLOSE RUN**: Exit the current run with this option. Times will be saved but cannot be modified later.

- **SYNCHRO**: to establish a new time-of-day synchronization.
  - Manual synchro
    - Enter Synchro Date (dd:mm:yy) and Time (hh:mm), confirm with ◄┘
    - Synchro the Minitimer with the Manual Green Key (1 – 4) or if the system should be synchronized as along with another device from an external input (1 – 4), do not forget to unblock the associated external input (Red key 1 – 4).
  - Slave synchro
    - This will put the Minitimer in Slave mode. The Device will wait for the time-of-day information through the serial Input « Printer » from another Minitimer «master»
- **Chrono Mode:**
  PTB Sequential: (1 to 4) or (5 to 8)
  Sequential recording of time-of-Day on 4 channels (8 channels if 2 HL 440's are connected together with RS232 connection). This mode does not calculate Net Times!
  In this mode, bib number entry is not possible.

  SPLIT: (1 to 4) or (5 to 8)
  Sequential recording of time-of-Day on 4 channels (8 channels if 2 HL 440's are connected together with RS232 connection). This mode will not calculate Net Times.
  In this mode, it is possible to enter bib numbers.

  TRAINING:
  This mode allows you to perform automatic timing for Training sessions, with a Start, two intermediates and a Finish. This mode will automatically recognize the bib numbers after the start at both intermediate locations and at the finish, through the "Capture windows" information specified in the Parameters Menu.

> **IMPORTANT**
> In the **TRAINING MODE**, several runs for a competitor can be memorised for later analysis during a timing session.

- **RANKING / RANK A SESSION**: (only in the Training mode)
  Ranking of the current timing session or any memorized session. Note that only the best time of each competitor will be displayed on the LCD or printed.

- **LISTING / LIST A SESSION:** (only in the Training mode)
  This is a listing of a competitor number's times in chronological order for the current session, or any memorized session. All the times (Inter 1, 2 and Finish) will be displayed for each run within the session.

# 01 COMPETITOR	1
INTER 1	10.23
INTER 2	23.56
FINISH	42.98

- **CLEAR MEMORY**: Clear the memory only when you start a new timing session and you are sure you do not need to retain the previous session(s) in memory!

- **PARAMETERS** :

  - **PRECISION**: you can choose the timing precision between 1 sec to 1/100'000th of second. The LCD display will show a maximum precision of 1/1'000th of second, however, all times transferred, memorized and printed are at the specified precision.

  - **LOCK TIME**: Lock-out time of the 4 inputs is selectable from 0.01 to 99.99 seconds. To enter 1.00 sec, press 1 – 0 – 0 and confirm with ◄┘.
    The minimum lock-out time of 0.01 sec should not be used with any mechanical triggering device (bounce may cause several impulses).

  - **INPUT STATUS**
    Selection of Inputs and their timing info functions info (transmit / received)

    UP Narrow: TRANSMIT
    DOWN Narrow: Received
    HORIZONTAL: Close
    The default status of the input is set as « Transmit » (after switching off)

  - **CAPTURE WINDOWS**: (only into the Training mode)
    The time window (min / max) automatically identifies the competitor number as he passes through the various timing points while his run is in progress.
    If the value is defined at 0, no restrictions are activated there is no guaranty that the competitor will be correctly identified.

  - **BEEP**: Audio Signal activation (ON/OFF). The last setting is memorized.

  - **RS232 PC**: Baud rate is selectable (2400 / 9600 / 38'400 / 57'000 and 9'600 Bds Select "Flow Control" for our radio Data / Voice transmission HL 680.

  - **RS232 AUX** : Data bus RS232 "PRINTER"
    - TO PRINTER : printer (ON/OFF)
    - TO AUX: Serial bus RS232 PRINTER is setup for Master/Slave mode.
    - To HL970/HL980: will send information to a display, including Net Time (especially for the Training Mode) – only for the training Mode
      - Running Time on the **TAG Heuer** display
      - Running Time of Day of the HL 440
      - Blank command to the Display

      Running time is the default setting
      Display Duration of net times is adjustable from 1 to 59 seconds using the ▲ Plus / ▼ Less arrows, then validate with ◄┘ (10 seconds is the default setting).

  - **LANGUAGE**: The Minitimer is programmed in English , German, French and Italian

  - **STATUS**: Capacity of the memory available, number of runs memorized and battery status in %.

  - **PRINT SETTING**: print the full parameter settings of your Minitimer, including memory status, timing mode, precision and input lock time.

- **PRINTER:**
  - **PRINTER OFF**: No output available. Serial bus is closed.
  - **PRINTER ON**: Times and Data are send to the Serial « Printer » connection.

> **IMPORTANT**
> When you turn on the Printer, all saved data will be printed.

- **DOWNLOAD:**
  - **TO PRINTER**
    Print all Times and data on the serial printer.
  - **TO COMPUTER**
    Send all data to the serial connection « Computer »in a traditional protocol
  - **TO CHRONO RS232**
    Send Data to another Timing device (like a CP540 or Minitimer)
  - **TO RS232 AUX**
    Send Data through the serial output « PRINTER »

- **DUPLICATE:**
  Allows another or several competitor N°s to be ass ociated with a particular start, intermediate or finish time already received.
  Not available for Training mode

- **INSERT TIME:**
  Allows you to create a particular start or finish Time–of-Day for any competitor.
  Not available for Training mode

- **NUMBERING**: You can select Manual or Automatic competitor numbering assigned to input 1 (Start) only
  Automatic: in ascending UP order
  Manual: enter the competitor's N°+ ENTER
  At any time it is possible to cancel the next competitor by pressing "0" + Enter.
  This is available only in the Training Mode

6. Opening Run and Timing

- Enter the menu (**F**) and select **OPEN RUN**
  Do not forget to unblock the external input (Red key 1 – 4), if necessary.

- The Minitimer records sequentially the time-of-day from each input. Each time can be matched with a competitor n°(N°+ ◄┘), before the impulse, or after with the RECALL function. Note: only in Split mode.

  SPLIT mode: Each time can be identified with a bib number (N°+ ◄┘) BEFORE the start Impulse or AFTER with the function **RECALL** «**R**»

  TRAINING Mode: it is important to define correctly the parameter "**CAPTURE WINDOWS**" (Max / Min) for the Intermediates and Finish.
  The time window (min / max) automatically identifies the competitor number's expected arrival as he passes through the various timing points while his run is in progress.

  - **For intermediate times**: if the crossing time is inside of the window, the bib number of the competitor will be automatically identified to the time, and the MiniTimer will automatically calculate the Net Time. If the crossing time is outside of this window (lower or higher), the time of the day will be saved, but without identification. It will be necessary to use the function <R> (Recall) in order to correctly identify this time, if desired later.

  - **For Finish**: if crossing time is inside the window, the time-of-day will be automatically identified with bib number, and the MiniTimer will calculate the Net Time. On the other hand, if the crossing time is not within the window, two scenarios are possible:
    - If the time is less than the MIN value entered in the "Capture Window," the time of the day will be memorized, but the running time will continue until the end of the window (MAX time).
    - If the time is greater than the MAX value entered in the "capture Window" parameter, the time of the day will be saved, but running time will automatically disappear at the MAX value, and competitor number will be identified as a "DNF." (Do Not Finish).

  Defining the capture Windows:

  In training mode, it is possible to send one or more forerunners to establish estimated arrival times for the training course. To tell the MiniTimer that a forerunner is about to start, press the "*****" key and then enter a bib N°+ ENTER.
  The forerunner will define the times at Inter 1 and 2, and finish.

  As soon the forerunner crosses the finish line, the Minitimer will switch automatically to the "**Capture Windows**" menu, and thus allows the operator to define the MIN / MAX settings for Inter 1, 2 and Finish. On the LCD, the times set by the forerunner will be shown, so that you can fine tune the "Capture Windows" settings.

  The times recorded by the forerunner are not included in **Rankings** or **Listings**.

  It is possible to cancel the new starter, in SPLIT and TRAINING mode by entering the bib's number "0" and valid with ◄┘.

6.1. RECALL function (R)

This allows you to:

- Recall all the memorized times from any input, from the buffer, with or without competitor numbers.

- Review and select times not yet identified with a bib number.
  Example:

  - Press **R**
  - Select Input
  - Scroll Up / Down with the ▼ and ▲ **keys**. Place the black arrow with the desired time
    _ _ _ _ ► 16 :55 :40.789
  - Enter the competitor number and confirm with ◄┘

  The ***** symbol is associated with this N° (indicates that this time was recalled and associated with a bib number).

- Recall competitor N° and modification.
  Example:

  - Enter the competitor N°
  - Press **R**
  - Select Input (1 – 4)
    The competitor N° to modify will be displayed.
  - Press ✱ (error) and enter the new competitor N°.
  - Confirm with ◄┘

  The ***** symbol is associated with this N° (indicates that this time was recalled and associated with a bib number).

- Direct time identification on an input
  - Press **R**
  - Select Input (1 – 4)
  - When a new time arrives, identify it immediately by entering the competitor N°
  - Validate with ◄┘

- Cancel errant time
  - Press **R**
  - Select Input (1 – 4)
  - Select the errant time by using “UP/DOWN” arrows
  - Press ✱ to request the change
  - Press “**0**” to cancel the time
  - Press ✱ to valid the cancelling

- Change indentified time
  - Press **R**
  - Select Input (1 – 4)
  - Select the time you want to change the identification by using “UP/DOWN” arrows
  - Press ✱ to request the change
  - Enter the new bib’s number
  - Validate with ◄┘

ATTENTION!

A time identified with competitor “0” deletes the time. The character “C” is memorized and associated with the time.

7. Download a new version of Firmware

Program downloads and new releases of the TAG Heuer firmware “up loader” are available free of charge on our website www.tagheuer-timing.com.

For this operation, you need to have:

- Sub-D9p cable HL 605-10
- The software «TAGHeuerFirmmanager.exe » installed on your PC.

Procedure

1. Copy the software «TAGHeuerFirmManager.exe » onto your hard disk drive
2. Connect the HL440 with the external power supply (The HL440 should be off before plugging in the external power supply). Do not turn on the HL440 yet!
3. Connect the RS232 cable (HL605-10) to the PC and to the HL440
4. Run the software « TAGHeuerFirmManager.exe »

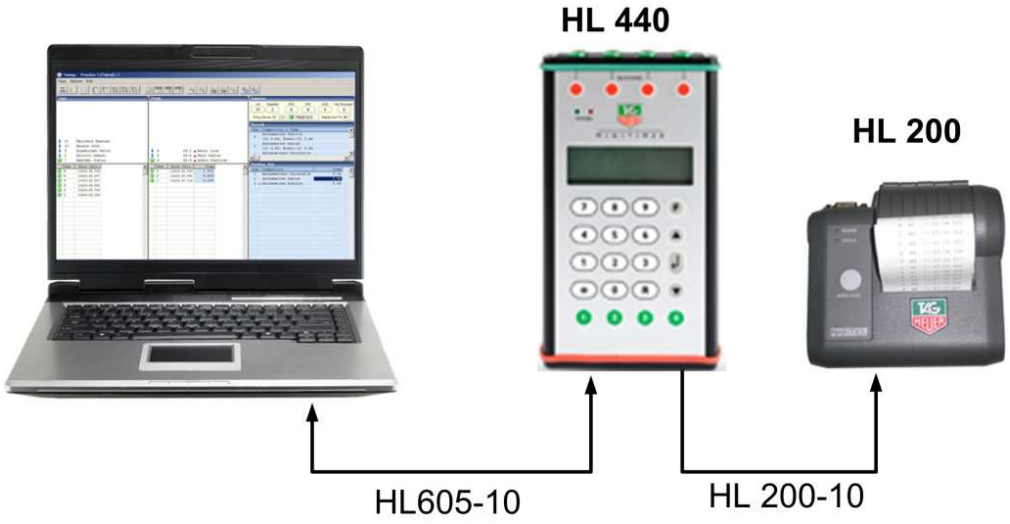
5. Select the COM Port
6. Select the file: Update (HL440_xxx.dat)
7. Press START on the software.
8. Power ON the HL440
   The HL440 will go into a special mode « Download ».
   The LDC back light will be ON, but LCD will be blank.
9. As soon as the upgrade is downloaded into the HL440, validate the software with OK.
10. Remove the RS232 cable from the HL440.
11. The HL440 is ready to use.

8. Protocol

Please refer to the TAG Heuer Timing Standard protocol: THCOM08

9. Configuration

9.1 Computer, Minitimer and a Printer

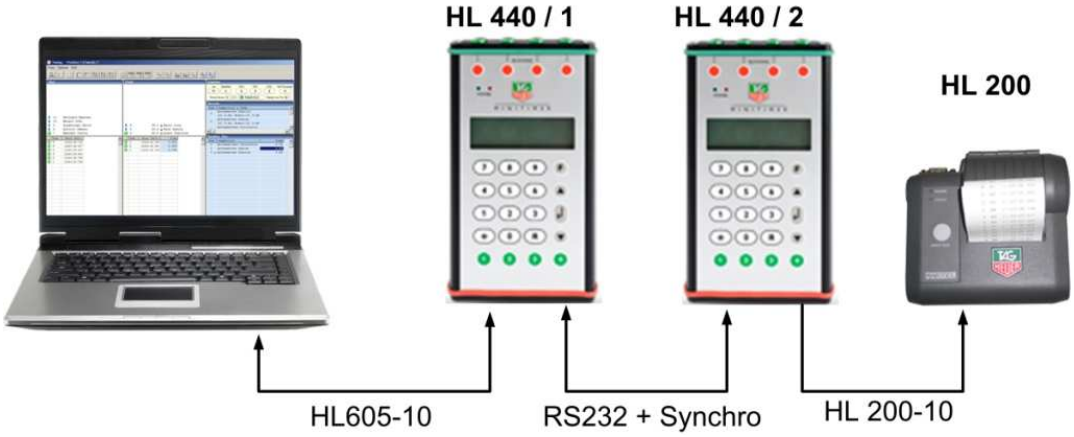


Settings

HL 440

Synchro: Synchro Manual
Setup: RS 232 PC → 9600 bps
RS 232 AUX → PRINTER
Input mapping : Input 1 to 4

9.2 Two Minitimer → 8 synced Inputs



Settings

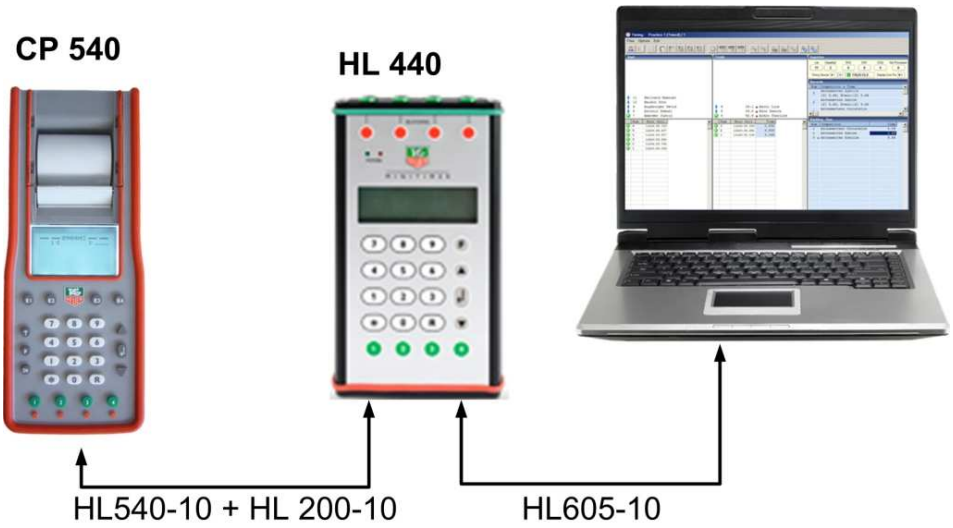
HL 440 / 1

Synchro: Synchro Manual
Setup: RS 232 PC → 9600 bps
RS 232 AUX → TO AUX
Input mapping : Input 5 to 8

HL 440 / 2

Synchro: Synchro Slave
Setup: RS 232 PC → 9600 bps
RS 232 AUX → VERS PRINTER
Input mapping : Input 1 to 4

9.3 Chronoprinter 540 – Minitimer – Computer (not synced together)



Settings

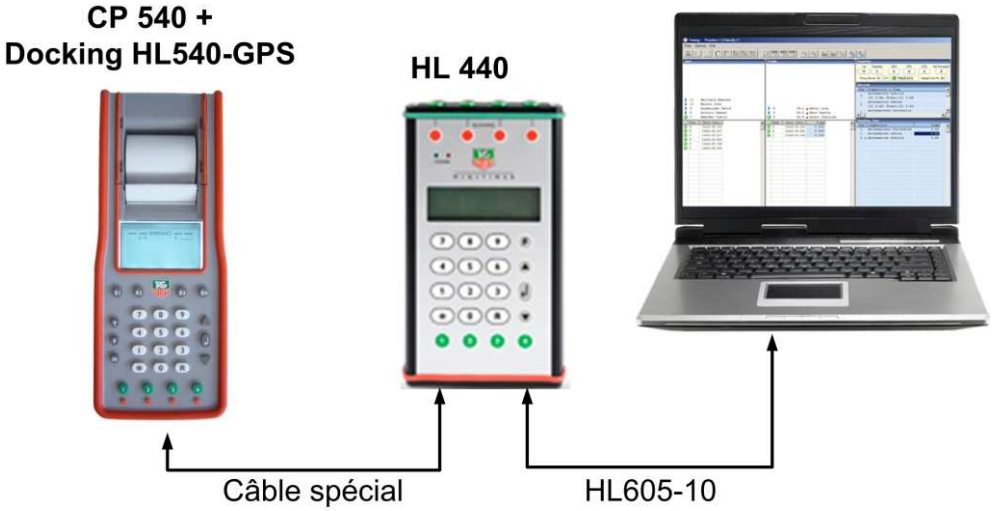
CP 540

Synchro: Synchro Manual
Timing mode: PTB SEQ 1 to 4

HL 440

Synchro: Synchro Manuel
Settings: RS 232 PC → 9600 bps
RS 232 AUX → VERS AUX
Input mapping : Input 5 to 8

9.4 Chronoprinter 540 synced with a Minitimer to a Computer



Settings

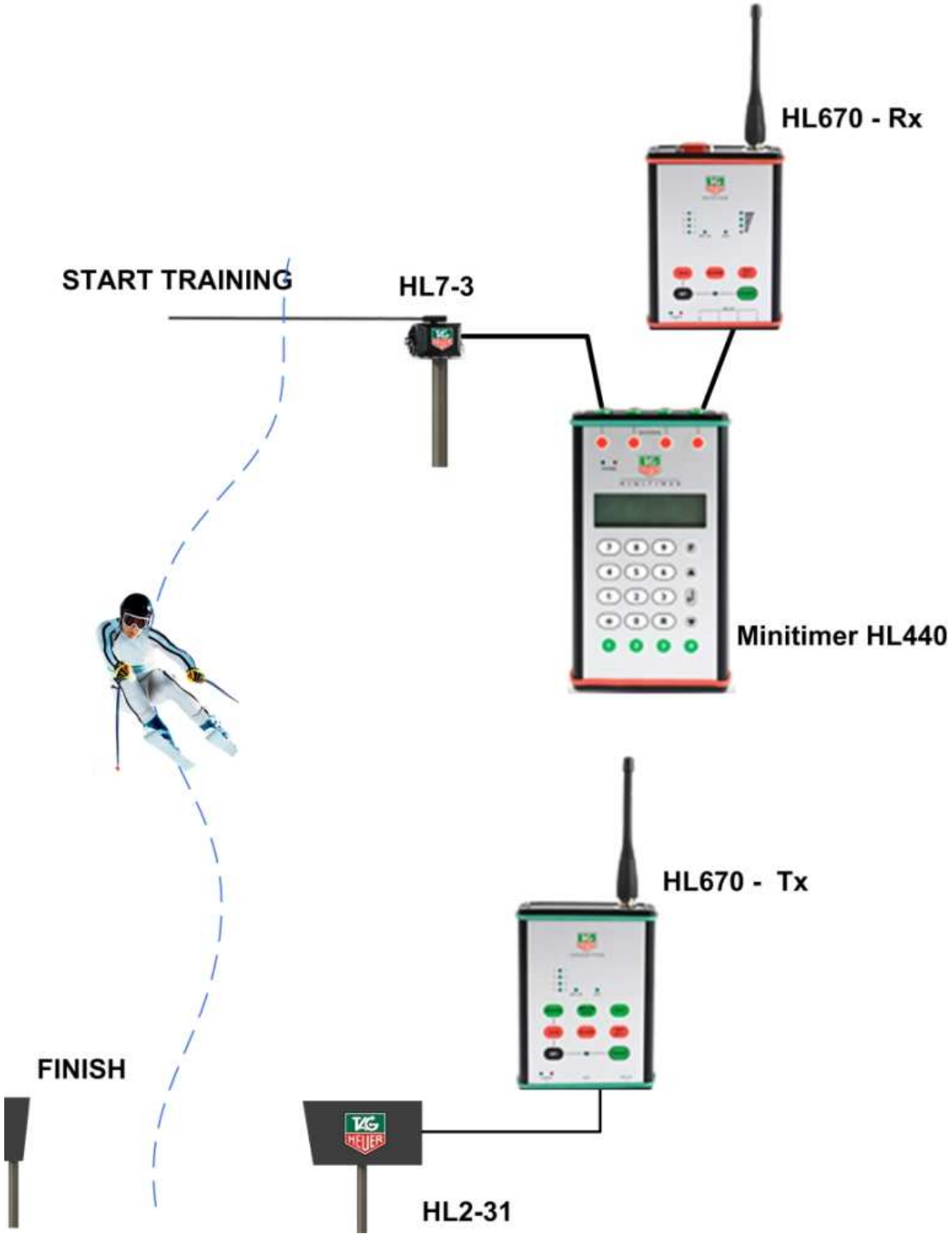
PC 540

Synchro: Synchro Manuel / GPS
Timing mode: PTB SEQ 1 à 4

HL 440

Synchro: Synchro Slave
Setup: RS 232 PC → 9600 bps
RS 232 AUX → TO AUX
Input mapping : Input 5 to 8

9.5 Training

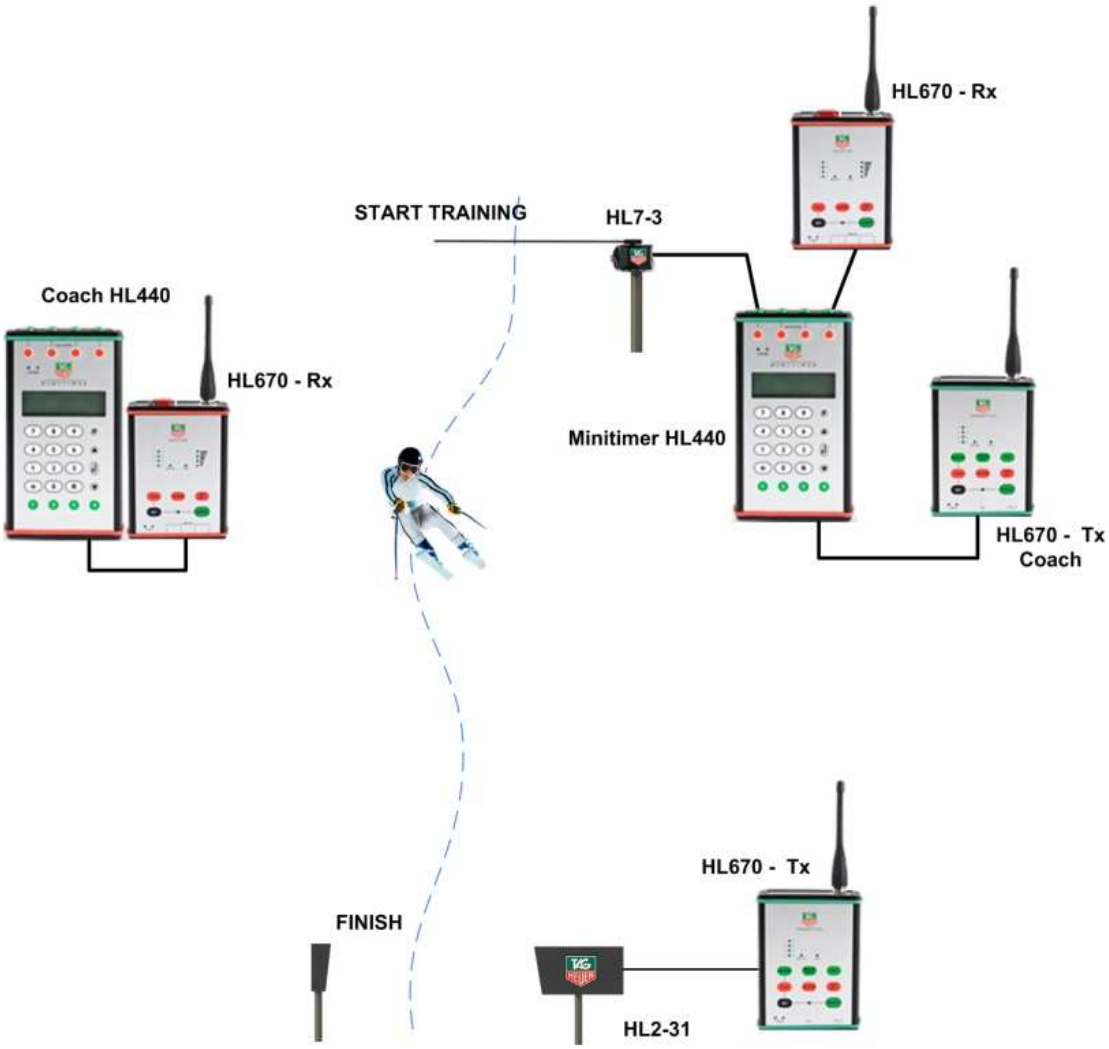


Settings

HL 440

Synchro:	Manual Synchro
Setup:	RS 232 PC → 9600 bps
	RS 232 AUX → TO AUX
	Input mapping : Input 1 to 4

9.6 Training with coach



Setting

HL 440 / 1

Synchro:	Manual Synchro
Setup:	RS 232 PC → 9600 bps
	RS 232 AUX → TO AUX
	Input mapping: Input 1 to 4

HL 440 / Coach's monitor

Synchro:	Manual Synchro
Setup:	RS 232 PC → 9600 bps
	RS 232 AUX → TO AUX
	Input mapping: Input 1 to 4
	Parameter : Capture windows has to be set exactly as HL440 / 1

9.7 Cable Pin-outs

HL 605-10: Sub-D9p, M/F (2-2, 3-3, 5-5)
HL 200-10: Sub-D9p, M/M (2-3, 3-2, 5-5, 9-9)
HL540-10: Sub-D9p / RJ45
Special cable CP540 to HL440 (Synchro)

RJ12 – CP540	RJ 11 Docking	Sub-D9p M	Désignation
3	2	5	GND
5		3	Rx/Tx
1		2	Tx/Rx
	1	9	SYNC

IMPORTANT

No data is transmitted if the Input mapping isn't set up correctly !
Minitimer: Parameters – Input Mapping
CP 540: Parameters – Input Status

10 Technical specifications

⇒ **General**	Stand-alone sports timing system. Timing resolution (printer – PC) from 1 sec to 1/100'000 sec Memory of 25'000 times and 99 timing sessions Sequential N° competitor N° from 1 to 9'999
⇒ **Inputs / Outputs**	Four banana jack inputs for external timing impulses (working contact, open collector) COMPUTER / Bidirectional RS232 (or to drive external display) PRINTER RS232 Expansion port available for future Docking Stations.
⇒ **Keyboard**	Numeric keyboard Three keys UP, DOWN and ENTER Four validation keys (“1” – “4”) RECALL key Four manual toggle keys to block and unblock the external Inputs.
⇒ **Display**	Matrix LCD display Adjustable contrast
⇒ **Time Base**	Thermo-compensated quartz 12.8 MHz Precision: +/- 0.5 ppm at 25° C Precision: +/- 1.5 ppm between -20℃ and +55℃
⇒ **Operating temperature**	- 20℃ (-4℉) to +55℃ (+131℉)
⇒ **Charging temperature**	0℃ (+32℉) to +30℃ (+86℉)
⇒ **Operating time**	38 hours (1 incoming impulse every 5 seconds)
⇒ **Internal power supply**	Rechargeable Li-ion battery
⇒ **External power supply**	12 V DC by adaptor (HL540-1) or 12 V batteries
⇒ **Dimensions / Weight**	197 x 105 x 35 mm Minitimer only: 500g

11 Notes

TAGHeuer

PROFESSIONAL TIMING

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